Torn nasoseptal flap, does repair of the perforation affect postoperative cerebrospinal fluid leak?

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Intro

The Nasoseptal Flap (NSF) is a valuable part of a multi-layer reconstruction for skull base defects.

- NSF is a posteriorly based axial pattern flap based off the posterior septal artery, a branch of the sphenopalatine artery.
- The NSF harvest involves raising a submucoperichondrial/submucoperiosteal flap from the nasal septum and/or nasal floor.
- Harvest can result in a perforation in the NSF in patients with prior septal surgery, a septal deviation, or a large septal spur.
- A perforation could render the flap less likely to stop a cerebrospinal fluid (CSF) leak.
- Our study aims to evaluate the rate of postoperative CSF leak in patients whose NSF was perforated during harvest and if that perforation requires repair.

Methods

- We analyzed our database of all patients who underwent endoscopic transnasal skull base surgery.
- Inclusion Criteria:
  - Patients undergoing endoscopic skull base resection from 2008-2013.
  - Reconstruction with NSF.
  - Operative videos were analyzed to confirm a mucosal tear or perforation during NSF harvest and if that tear was repaired.
- The size of the tear was estimated by comparing it to the size of the spatula end of a Cottle elevator. (The Cottle elevator used was a Bausch and Lomb, model number N4660, with a 3mm spatula end.)
- Diagnosis, performance of septoplasty, type of repair, and placement of bumer drain were recorded.
- EMR reviewed to assess for any immediate or delayed postoperative CSF leak.

Results

- 1,448 endoscopic skull base procedures since 2008.
- 34 patients fit our inclusion criteria and had adequate video.
- 12 patients had a perforation in the NSF during harvest identified on video.
  - 4/12 had tear in NSF reapproximated with chromic suture prior to inset.
  - 0 patients with a postoperative CSF leak.
- The perforations were located either at the maxillary crest or along the septal spur and ranged in size from 3-15 mm, with a mean size of 7.3 mm.
- Pathology: 4 meningiomas, 4 meningeoepithelialoeces, 1 chordoma, 1 craniopharyngioma, 2 pituitary adenoma.
- Repair Technique: NSF alone (n=2), synthetic dural substitute + NSF (n=4), fascia lata button graft + NSF (n=5).
  - 4/11 had a lumbar drain placed at the time of surgery - all 4 were undergoing meningoencephalocele repair.

Discussion

- NSF is widely accepted as the reconstructive workhorse for skull base defects.
- Do not repair site morbidity, such as septal perforation or flap loss is rare.
- Perforation of the NSF can occur in patients with prior septal surgery, significant septal deviations, and septal spurs.
- Previous surgery, tumor extent, and location of the defect can help determine the side of NSF harvest.
- If feasible, we typically elect to raise the NSF from the side of the septum with the large spur or deviation to preserve the mucosa on the contralateral side and decrease the risk of bilateral mucosal perforation.
- The edges of the perforation are approximated to prevent a large hole in the NSF.
- The tear can also be closed with a chromic suture, but this is not critical.
- We do not find it necessary to reinforce the perforation with additional tissue such as fat or fascia.
- The key to preventing postoperative CSF fistulas in a perforated NSF is a stable primary dural repair.
- The primary dural repair acts as the first line of prevention of CSF leakage and allows time for the NSF perforation to heal and adhere to the skull base.
- The NSF allows for early and rapid reepithelization which has cut down on the postop CSF leak rate. The flap doesn’t provide a water tight seal. This is created by the primary dural repair.

Conclusion

- A small tear in a NSF is unlikely to affect the post-operative CSF leak rate.
- Our early experience suggests that these perforations do not require primary repair.

References